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SYNTHESIS AND RESEARCH OF POLYFUNCTIONAL SILICON-CONTAINING AMINE - A NEW PROMOTOR OF ADHESION

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Abstract. Various types of aminosiloxanes are used to improve the adhesion characteristics of coatings, since silicon-containing compounds can significantly improve the adhesion of polymer resins to substrates such as glass, silica, aluminum oxide and active metals [1,2]. Polyfunctional aminosiloxane is obtained by the interaction of 3-aminopropyltriethoxysilane with monoethanolamine in the presence of a binary antioxidant and catalytic alkaline amounts of alcohol metal.

The reaction of interaction of (3-aminopropyl)triethoxysilanewith monoethanolamine in the ratio 1: 3:

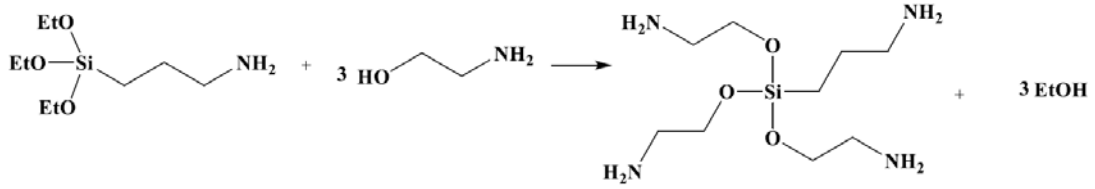

Table 1. Structure and properties of aminosiloxanes

№	Name	ν_1 : ν_2	Reactionyield, %	n_D^{20}	IR spectroscopy, ν, cm^{-1}:	^{1}H NMR- spectrum (DMSO – d6, 500.13 Hz), d2, m.d.
1	3-aminopropyl-tri- (2-aminoethoxy) silane	3:1	97,6	1,4650	1590 (Si-O-C); 3362,3293 (NH2); 1083-1020 (Si-O)	0,57 с (2H, CH_2Si), 2,50 с (8H, $4NH_2$), 2,544 м (2H, $CH_2\underline{CH_2}CH_2$), 2,546 т (8H, $4NH_2\underline{CH_2}$), 3,333 т (6H, $3H_2NCH_2\underline{CH_2}O$). M 270.384

3-aminopropyl-tri-(2-aminoethoxy) silane is an oily transparent liquid of light-yellow color. In the IR-spectra of the received products are observed intensive absorption bands at 1081-1085 cm^{-1}, characteristic for Si-O-C ligaments. The bands of the hydroxyl group, indirectly bound to the silicon atom, are absent, and the bands corresponding to the NH_2 group are observed at 3275 - 3373 cm^{-1}. In NMR ^{1}H - the spectrum of connections have signals at 0.563 m.d., relating to protons $\underline{CH_2}Si$, and at 2.50 m.d. to the signals of aminogroups. In the spectrum of connections there are oscillations of protons $O\underline{CH_2}CH_3$ group, which testifies to the complete replacement of ethoxygroup in 3-aminopropyltrietoxyxylane in 2-aminoethoxygroups.

References

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